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Mung beans are now attracting attention in Oklahoma because of their food and forage value. They are also a soil-building crop.

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Mung Beans for Oklahoma

By HI W. STATEN

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The Mung bean *(Phaseolus aureus)* is a summer annual legume which grows one to three feet tall with clusters of yellowish flowers. It is native of southern Asia and is of ancient culture. The seeds are used for human food and the plant for forage. It is grown quite extensively in Oklahoma but has never competed commercially with the cowpea, which it somewhat resembles, until the last few years. This legume now is attracting considerable interest in the State because of its food and forage value.

Varieties

Golden mung bean is an erect, bushy, summer annual legume which has greenish-yellow flowers. The plants will reach a height of three to four feet on average soil. It produces an abundance of short branches and leaves. The pods are about three inches long and turn black when ripe. There are eight to ten seeds per pod. The seed is golden in color, which accounts for the variety name. It is not a prolific seed producer, which somewhat limits the acreage planted. The seed is rather difficult to harvest because of the indeterminate growth habit of the plant. This causes the seed pods to mature irregularly during the season. The seed also shatters easily at maturity.

Green mung beans vary considerably in their growth habit. Some of the selections are viny and dwarfy, growing much like cowpeas, while others are semi-erect or bushy. This variety is also a summer annual legume, having seed pods very much like the golden variety except that the seed is green. Some of the selections produce seed which is dark green and slightly mottled, while the seed of others is bright green and very hard in texture. It is a very prolific seed producer, and although the plant is somewhat indeterminate in its growth habit, it does produce seed pods much more uniformly than the golden variety.

At the present time, many selections of the green mung bean, commonly called natives and orientals, are being grown by farmers and seedsmen in Oklahoma. The so-called natives are the large, dull-colored beans which have been grown in

Oklahoma for several years. The orientals are the shiny, hard-textured beans which have been recently imported from foreign countries.

Adaptation

The mung bean is adapted to the same general area now occupied by the cowpea. It does well in most sections of Oklahoma; however, the central section from north to south seems to be particularly adapted to its growth. It has been grown successfully in practically every section of Oklahoma except the extreme northwestern counties. It grows well on most any type of soil but is best suited to the warm sandy loams.

Uses

The golden variety is used primarily for soil building, hay, silage, and pasture. Some data by H. F. Murphy,* of the Oklahoma Experiment Station, indicate its possibilities as a green manure crop. On July 9, 1929, the mung beans were planted on double-disked barley, oat, and wheat stubble land. The beans were double rowed, making the rows 21 inches apart. The yields were taken on September 27, at which time the first pods were turning brown, and indications were that the vegetative growth of the plants was complete. The yields per acre of green forage were as follows: after barley, 6,234 pounds; after wheat, 5,686 pounds; and after oats, 4,324 pounds. The ratio of stems to leaves was approximately 1:1.5. The amount of nitrogen in the roots was 0.75 percent, in the leaves, 1.81 percent, and in the stems, 1.48 percent. Golden mung beans were also planted at Carrier, Oklahoma, on July 15, 1929, with a lister planter on one-way disked barley and wheat stubble. On October 7, the following yields were obtained: after barley, 9,048 pounds; after wheat, 6,126 pounds of green forage. The rows were 3½ feet apart, and no cultivation was given the beans after planting.

The golden variety also makes good hay and silage. It is more easily harvested than cowpeas because of its erect habit of growth. When used for pasture, the crop may be grazed when the plants have completed most of their vegetative growth.

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* Murphy, H. F.: "More Mung Beans." *Better Crops With Plant Food,* November, 1930. pp. 28-29+.

The green mung beans are used for soil building, forage, and food purposes. This variety does not produce as much forage as the golden variety, but because of the abundance of seed, it is more commonly planted for feed and for soil building.

The present interest among many farmers and seedsmen in Oklahoma is to produce these beans for commercial sprouting and canning. Heretofore, the bean supply for sprouting came from China and other Asiatic countries. The present World War has stopped all importation of this food product, and there is a pressing demand for sprouting beans. The bean sprouts are used particularly by the Chinese restaurants for making chop suey, chow mein, and other articles of diet. Not all green mung beans are suitable for sprouting. Seemingly, varieties grown by the Chinese farmers have certain sprouting propensities not found in common green beans which have been grown in Oklahoma for several years. A bean which meets the requirements of the sprouters must have a shiny seed coat and hard texture. Ordinarily the large, dull colored, and soft-textured beans will not sprout with entire satisfaction.

According to Dr. V. G. Heller,* of the Agricultural Chemistry Research Department of the Oklahoma Agricultural Experiment Station, green mung beans have the following approximate chemical analysis: protein 23.31 percent; water, 9.31 percent; nitrogen free extract, 59.85 percent; fat, 1.02 percent; fiber, 3.64 percent; and ash, 2.87 percent. He also states that Vitamin A is present in amounts greater than is to be found in many seeds, that a plentiful supply of the vitamin B complex is present when the bean composes 60 percent of the ration, and the bean with the addition of sodium, calcium, and chlorine seems to provide a complete mineral ration when fed to rats. The indications are that the mung bean is a superior type of bean from a nutritional standpoint, but it is not adequate as a sole source of protein.

Date of Planting

Mung beans may be planted from April to July. The May plantings have given the best yields of hay at the Oklahoma Experiment Station. This legume is sometimes planted in late June or early July following a small grain crop. When moisture conditions are favorable, good yields of forage or seed can

* Heller, V. G.: "Nutritive Properties of the Mung Bean." *Jour. Bio. Chem.* 1927.

be obtained at this late date. When the crop is to be used for seed, late planting on stubble land is a good practice; however, one cannot rely upon this method of planting every year. Best seed yields will be obtained by preparing a good seedbed and planting in May or early June. The young seedling will not do well in a cold wet soil, therefore, one should not plant until the soil is warm. Mung beans will germinate in a soil having a low moisture content. The plant is fairly drouth resistant.

Rate and Method of Planting

Planting either in 3- to 3½-foot rows, or with a grain drill, is satisfactory. Most mung beans are planted in rows at present, but drilling is becoming more popular as the seed becomes more abundant and power machinery is used in harvesting. No experimental work has been done to show which method will give greater yields.

When planted in rows and the seed are to be used for commercial purposes, the seedbed should be well prepared and the beans planted on the level. The green mung beans should not be planted in a lister furrow when grown for seed. The lister furrow method is satisfactory for the golden variety when planted after small grain. A two-row corn planter is best for row planting. If a grain drill is used, each alternate hole in the drill should be stopped, thus placing the beans in 14- to 16-inch rows. A well prepared and firm seedbed is essential if the drill method is used. Drilled mung beans make a finer hay and there is less waste in feeding. When mung beans are planted in rows, only five to eight pounds of seed are needed per acre. When the grain drill is used, 15 to 25 pounds of seed are required. When the beans are planted with the grain drill, they will ordinarily control weeds provided the seedbed is well prepared. The seed should be inoculated before planting.

Harvesting the Crop

If the crop is to be used for forage, it may be harvested either with a mower or with a binder. If a mower is used, the plants should be allowed to partially cure in the swath, then windrowed or cocked to complete the curing process. Like all large-leaved legumes, they should be put into the stack or barn just as soon as safety permits, to prevent the loss of the leaves. The best time to harvest for forage is when the plants have reached their maximum growth.

Seed are often difficult to harvest because they shatter so readily. Some strains of the green mung bean varieties are more resistant to shattering than others. The pods may be picked or stripped by hand. They can be harvested much more rapidly than cowpeas, because the beans are produced in bunches. If planted in rows, a bean harvester which cuts two rows at a time and throws the two rows together may be used. After the beans are dry, they may be harvested with a combine or thresher. When drilled, the beans may be harvested with a combine with good success. In the case of the golden mung bean variety, a beater-type thresher may be used. Such a thresher can be made from an old grain binder.

Green leaves and immature pods are often collected in the harvesting, causing excess moisture in the seed. In such cases, the beans should be spread out thinly to dry before being put into sacks or bins. They mold quickly if the green pods and leaves are not allowed to dry before they are stored. Beans which contain over 15 to 16 percent moisture may heat in storage, and stored beans should therefore be watched carefully to detect heating.

Yields

The golden varieties will yield one to two tons of air dry hay per acre. The green varieties will not yield over half that amount. Four to five bushels of seed per acre is an average yield of the golden mungs, while the green varieties will yield from 12 to 15 bushels per acre.

In 1941, the Oklahoma Experiment Station planted 28 different strains and selections of green mung beans. This test was conducted on average bottom land and very good seed yields were obtained. Many of these selections were from imported sources, while others were selections from the Bureau of Plant Industry, in Washington, D. C. The yields of these many selections varied from 2.5 bushels to 25 bushels per acre. Some of these selections show promise for upright growth, shiny hard-textured seed, and more uniform ripening of the seed pods. These selections show possibilities for machine harvesting. No seed of these selections are available at the present time.

Markets

There is a ready market for any of the mung bean varieties, whether used for forage, soil improvement, or sprouting. Farmers who are accustomed to growing mung beans often find them to be an excellent cash crop.

The market demand by eastern canning and sprouting companies and Chinese eating houses for good green mung beans is great at the present time. Farmers may find it a profitable crop for the next few years, and Oklahoma is well located from the standpoint of climate, soil, and harvesting facilities to become the largest mung bean-producing state in the United States.

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